

Dose Measurements in SIS18 and in the experimental halls TR, EX, TH

T. Radon¹, K. Beverung¹, G. Fehrenbacher¹, C. Pöppe¹, and J. Sauer¹

¹GSI, Darmstadt, Germany

Dose Measurements in the SIS tunnel

During the accelerator development beam time in June 2012 dose measurements were performed in the SIS tunnel. The aim of the measurements was to get information about beam losses around the ring during fast and slow extraction of 14-N beams at energies of 1.9 GeV/u. About three hours of dose collection time was taken for each scenario. The intensities of the beams were 1.1E10 and 1.2E10 particles per second for the fast and slow extraction mode respectively. A thermo-luminescence detectors system [1] was placed on the floor approximately 3 meters away from the beam line.

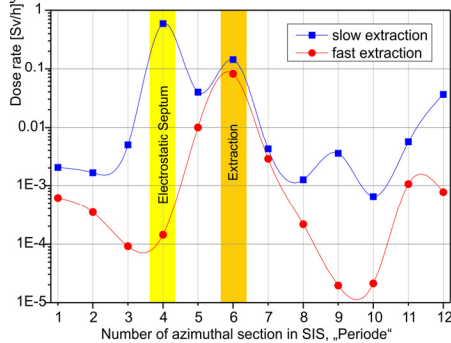


Figure 1: Neutron dose rate as a function of the azimuthal section in the SIS tunnel for slow and fast extraction.

The absolute maximum of the dose rates for fast extraction is clearly located at the extraction section of the SIS. However for the slow extraction mode the beam losses are even higher and have their absolute maximum at the electrostatic septum. The ratio of the dose rates at this position is nearly 4 orders of magnitude clearly demonstrating the different beam loss scenario.

Comparison of the annual doses outside the shielding with previous years

Due to the longer shut down periods and thus less beam time compared to 2011 the integral annual doses in 2012 are much lower than in the previous years, see ref. [2]. In particular the missing high current experiments for the pion production lead to considerably lower doses in the NE5 area. Also the area around the extraction from SIS, the target area of the fragment separator and the HHD beam dump usually being the hot spot in the dose chart reveals doses which are a more than factor of 5 lower compared to previous years.

References

- [1] F. Gutermuth, T. Radon, G. Fehrenbacher, and J.G. Festag, *Kerntechnik* (2003), 68, 4, pp. 172-179
- [2] T. Radon, et al. GSI-Report 2011-1 (2011) p. 352.

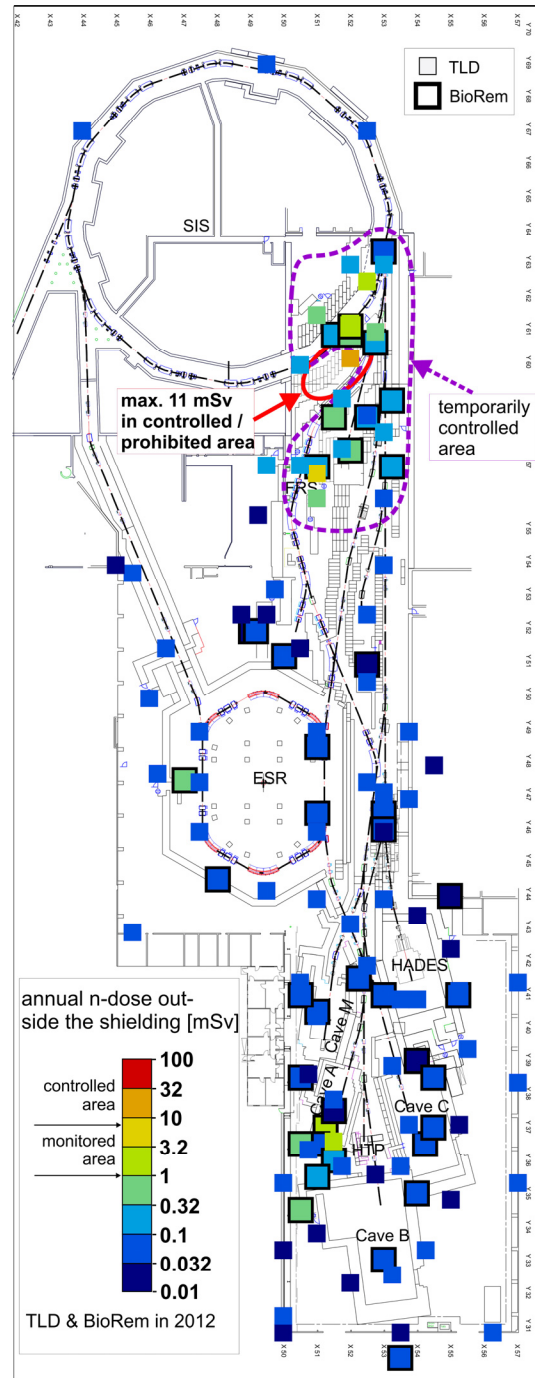


Figure 2: Map of the experimental areas fed by SIS. Measurement positions are shown with doses recorded by active dosimeters [2] (larger squares with frame) and passive detectors [2] (smaller squares).